



# Conservation Curriculum

## Monitor Your World!

Here's a chance to use and improve your monitoring skills. The preK-4 activity, "Monarchs and Viceroy's," (pages C2-C3) acts as a supplement to programs like Project Monarch Watch and Journey North. Students learn to identify monarch and viceroy butterflies and explain why these butterflies look so much alike.

"Birding 101" (pages C4-C5) is geared towards skill enhancement – in this case birdwatching. Use these tips to help you get started in programs like Classroom FeederWatch and the Great Backyard Bird Count. As a supplement, we have provided a pull-out poster displaying basic bird identification tips.

"Mapping Missouri Fish" (pages C6-C7) allows students to conduct research on the internet and create maps for the distribution of a group of fish. This activity could be easily incorporated into a project or explanation of GIS (see pages 4-5). The previous two activities are adaptable for any age level and do not indicate grade level.

*Let us know what you think about the "Birding 101" format and poster! Would you like to see more skills enhancement information, or would you rather have activity plans? Send your comments to: <grayg@mail.conserva-tion.state.mo.us>.*

## Missouri Department of Conservation's Education Website

**<www.conserva-tion.state.mo.us/teacher>**

Check out the Missouri Department of Conservation's education website. Much of the MDC education curriculum is now online and available for all grade levels. Materials cover various levels and topics and are interdisciplinary to help instructors reach program goals. *The Resource* is downloadable from this site. A special feature allows you to search for information on various topics including reptiles, prairies, birds and more. This site also displays the most current information on all teacher workshops given by Conservation Education Consultants.

The Conservation Department's Kid's Page (<<http://www.conserva-tion.state.mo.us/kids>>) is also expanding. Have students play our online, multimedia game, "Leaf Invaders." They'll have a great time and learn how to identify common Missouri leaves!

## Outdoor Classroom GRANTS



Outdoor Classroom grants will be available for the 2001-2002 school year. Revenue for the grants was generated from sales of conservation license plates, by the Missouri Conservation Heritage Foundation, and matching funds from the Missouri Department of Conservation. All schools registered with the Department of Elementary and Secondary Education are eligible to apply for these grants. Grants are available for a wide array of outdoor classroom projects and requests may be up to \$2,500.

Your grant application will require that you contact your local Conservation Education Consultant (CEC) and arrange for a site visit prior to grant evaluation. You need to contact your local CEC as soon as possible, as their schedules fill quickly. If you do not know your local CEC, you may e-mail <[oece@mail.conserva-tion.state.mo.us](mailto:oece@mail.conserva-tion.state.mo.us)>.

To obtain a grant application either send us an e-mail or write to:

Outdoor Classroom Grants  
Missouri Department of Conservation  
PO Box 180  
Jefferson City, MO 65102-0180

**Application  
deadline  
May 4, 2001!**



# Monarchs and Viceroy



## PreK-4

### Objectives:

After completing this activity, students will be able to:

1. Identify differences between viceroy and monarch butterflies [1.6]
2. Explain why viceroys and monarchs have similar wing patterns [SC3]

### Materials:

copy page (copy on white), crayons, popsicle sticks (optional), masking tape (optional)

### Procedure:

1. Introduce students to monarch and viceroy butterflies.
2. Provide each student with a copy page. Have students color the butterflies.
3. Have students list or tell similarities and differences about the two pictures. Discuss these observations as a class.
4. Explain why it is advantageous for the viceroy to mimic the monarch.

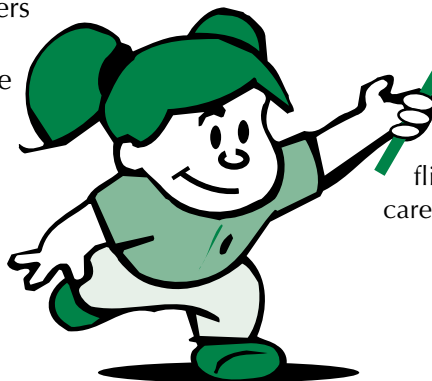
### Extension:

Have students cut out monarch butterflies from the copy page and tape onto popsicle sticks. Reenact the monarch's migration in your classroom or outside, using the background information as a guide.

### Monarch Butterfly

The monarch is the best-known butterfly in North America. An adult monarch has wings of a striking reddish-brown, with black veins, black borders and two rows of white dots. Its wingspread can reach up to 4 inches.

Although many insects migrate, the monarch is the long distance butterfly champion! Each autumn, Missouri monarchs join others that have come from as far away as Canada and migrate south to a small alpine fir forest in Mexico. Each monarch (weighing only about half a gram) can migrate over 2,000 miles. The trees in the fir forests may be completely covered with monarchs!



Monarchs leave their wintering grounds in March. On the northward journey, females stop to lay eggs on the underside of milkweed plants and die shortly thereafter. The offspring continue to migrate, returning to the same North American regions where their parents lived.

When monarch larvae feed on milkweed plants, they accumulate a poisonous substance in their bodies that makes them distasteful to birds and other predators. Birds learn to recognize the butterflies' bright pattern and avoid eating them.

### Viceroy Butterfly

The viceroy butterfly is a black-and-orange non-poisonous butterfly that is very similar to the monarch. It can be distinguished from the monarch by the black line that crosses its wings. The viceroy is an edible species, but because it looks like the distasteful monarch, it is seldom bothered by predators.

Viceroys do not migrate. The eggs of the viceroy are laid at the tips of oak, willow, birch or linden leaves. The viceroy caterpillar feeds on the leaf tip on which it was hatched and then undergoes metamorphosis into an adult the following spring.

### How to Make a Butterfly Net:

**Materials:** wire clothes hanger, 5-gallon paint strainer, broom handle or wooden dowel, duct tape

- Bend the hanger into a square
- Sew the 5-gallon nylon paint strainer onto the hanger as a net.  
(Paint strainers are available at most paint stores for about \$1.25 each).
- Connect the wire hanger to a broom handle or wooden dowel with duct tape.

Locate butterflies feeding on flowers. Approach them slowly, as sudden movements will startle butterflies into flight. Sweep the net forward quickly and flip the end of the net bag over the net handle. Observe carefully and release.



# Monarchs and Viceroy

Name: \_\_\_\_\_

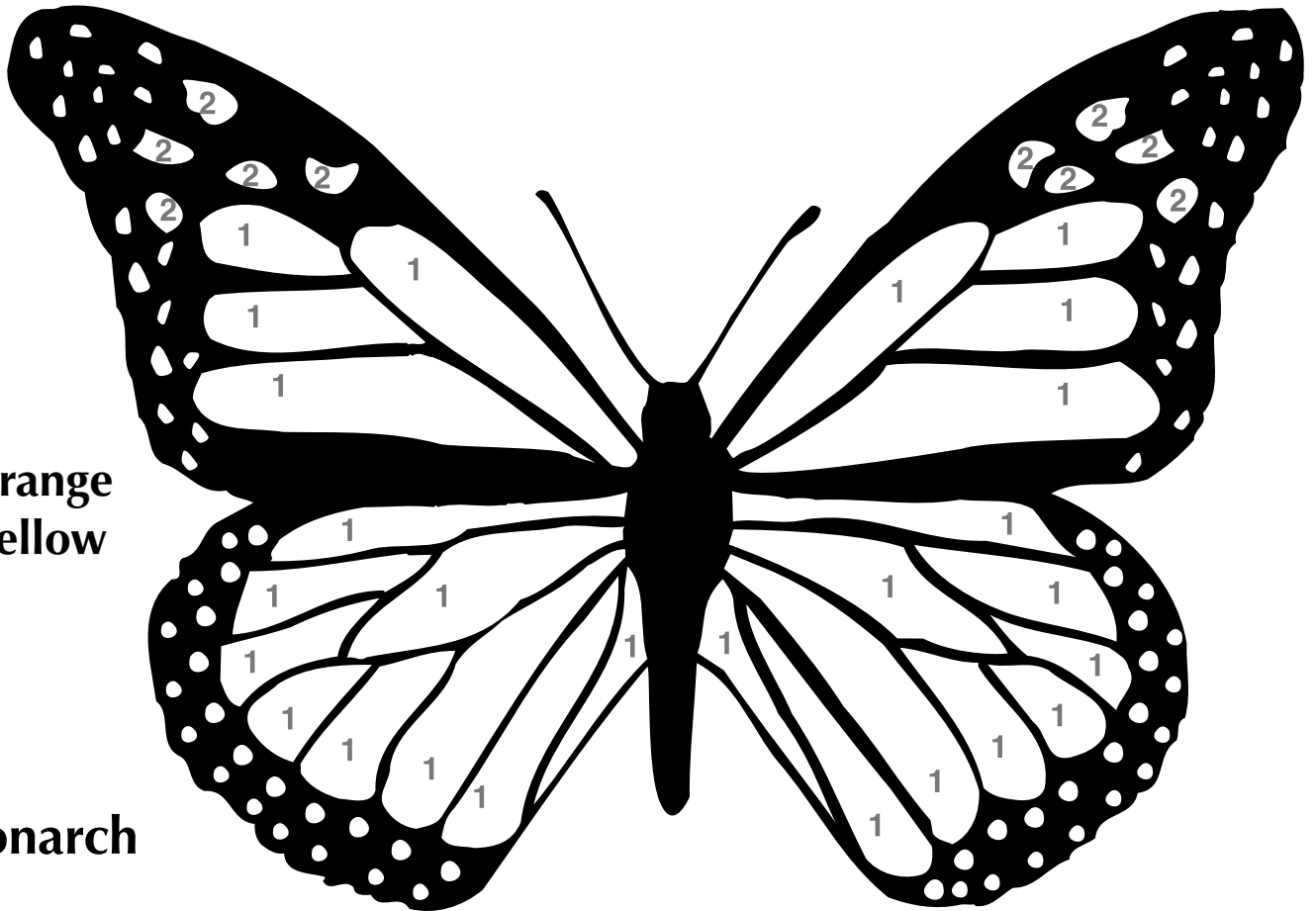
**Directions:** Color the wings of both butterflies by following the key. How are these two butterflies alike? How are they different?

## Key

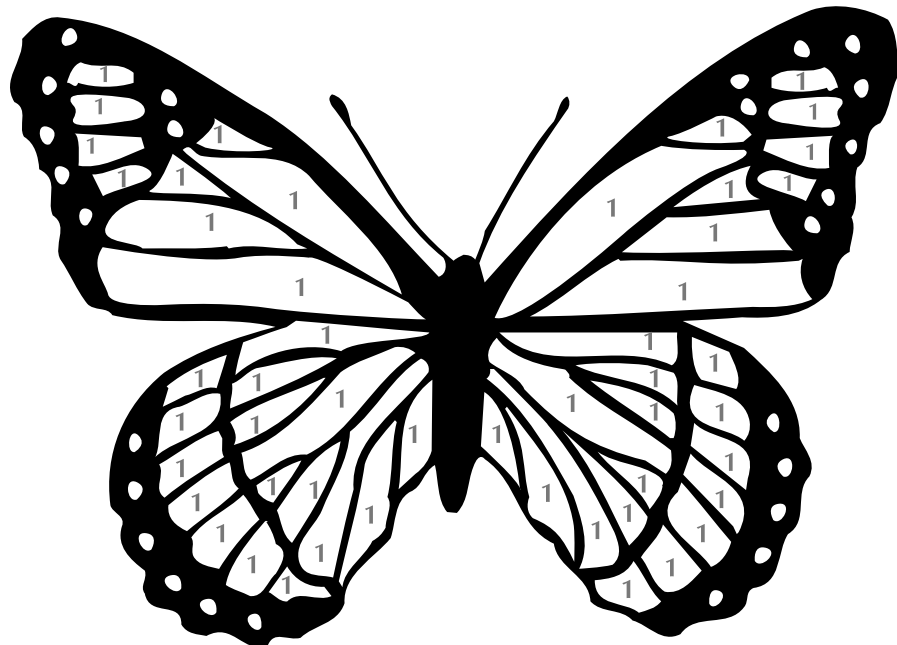
1 = orange

2 = yellow

Monarch



Viceroy



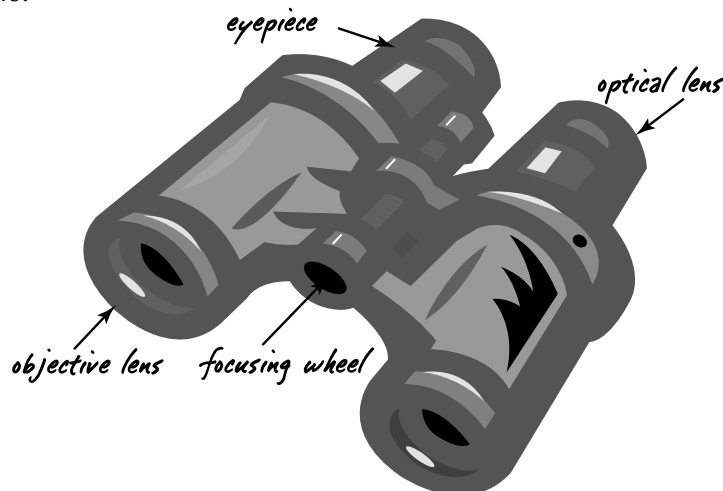
# Birding 101

Bird watching is one of the nation's favorite pastimes! It's easy to get started – all you need is a good field guide and binoculars.

## Binocular Basics:

Binoculars are very important, if not essential, to bird watching. Here are a few tips to help you make the most of your viewing time.

1. **What do the numbers mean?** Most binoculars have two numbers printed on the body that are separated by an "x" (example: 7x35 or 8x40). The first number shows magnification power and the second indicates diameter of the objective lens in millimeters. The larger the diameter, the brighter the image. Most popular among experienced birders are the binoculars designated as either 7x35 or 8x40. Those larger than 10x50 tend to be overly bulky and difficult to hold steadily.
2. **A two for one view!** Most binoculars have a hinge holding both sides together. This allows users to adjust for the distance between their eyes. If you don't adjust the hinges properly, you may see black spots or two separate images of the same bird. Push or pull the sides apart until you see one circular image.
3. **Eyeglasses remedies.** With some binoculars, a person wearing glasses can see only 60 percent of the field of view. Adjustable eye cups that screw or fold down can partially increase the field of view.
4. **Don't forget to adjust the eyepiece!** Focusing binoculars is a two-step process. The main focusing wheel will bring an item into focus, but you may also need to adjust for differences in the strength of each eye. To correct for your eyes, focus on an object at a middle distance. With your right eye closed, turn the main focusing wheel until the image looks clear to your left eye. Then, with your left eye closed, slowly turn the eyepiece until the image is crisp for your right eye. When you're finished, look at the eyepiece scale, and use that setting whenever you use these binoculars.
5. **Voila!** Now for the tricky part – getting the binoculars to your eyes without losing sight of the bird. Practice keeping your eyes on the bird, and bring the binoculars to your eyes. For optimal comfort, binoculars should hang about six inches below your chin.



## Bird Identification Field Guides:

The three recommended are each illustrated in color, show range maps for all species and contain a birder's checklist. They are standards in the field and are available at most bookstores.

1. **A Field Guide to the Birds**, written and illustrated by Roger Tory Peterson. Published by Houghton Mifflin Co., Boston. The eastern edition covers all birds east of the Rocky Mountains and north of Mexico. Great for beginners. Features arrows that point out distinguishing field marks from similar looking birds.
2. **Birds of North America**, by Robbins, Bruun and Zim. Illustrations by Arthur Singer. Published by Golden Press, New York. Covers all birds native to North America north of Mexico.
3. **Birds of North America**, by the National Geographic Society. Covers all birds of North America north of Mexico.



# Birding 101

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C-5

## Keep a Birders Journal!

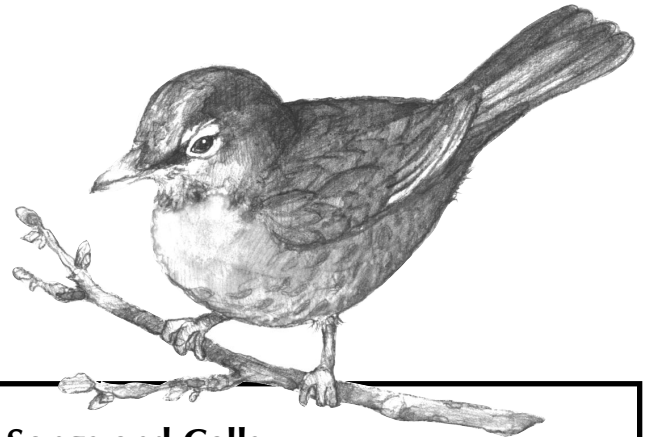
Start with a pocket-sized notebook. When recording your observations, include the following essential information – the date (day, month, year), time of day, location (as specific as possible; include the city, county and state. Write the location so that anyone could find the site 50 years from now), weather conditions, your name and the people with you. Then, write down details of what you see - bird species, numbers, ages, sexes, plumage, field marks and other identifying characteristics. Make sketches from your observations.

## Start Your Life List Today

Many bird watchers set a goal of spotting as many bird species as possible. To keep track, they keep a life list – a list of every type of bird that they have ever identified. An average list for a bird watcher in North America might include 300 to 500 birds. Bird watchers who travel the world often have more than 6,000 birds on their list. Make a spot in your notebook to list every species that you encounter.

## Identification Tips:

1. Talk softly to yourself when watching a new bird. Describe it to yourself: e.g., "It has an eye ring, two wing bars and is streaked underneath." This will help you remember the traits when looking in a field guide.
2. Go birding with avid birders! Local organizations such as the National Audubon Society are always willing to assist budding birders! New birders are welcome to join bird walks with the different Audubon Chapters around the state, and you don't have to be a member to tag along. Experienced birders will be able to show you behavioral traits to watch for and may help you realize the importance of listening. To find the nearest Audubon chapter to you, visit [www.audubon.org/chapter/mo/mo](http://www.audubon.org/chapter/mo/mo).



## Bird Songs and Calls:

Many birds have voices that may be described with words or syllabifications for easy identification. Missouri Bird Calls, a 45-minute audio tape, may be ordered by writing to Nature Shop, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102. Please call 877-521-8632 (toll free) for pricing information.

### Killdeer

"killdeer, killdeer, killdeer..." loud and repetitious

### Northern Flicker

"flicka, flicka, vlicka, vlicka, vlicka" loud and sharp also a loud piercing call like a slice in the air "teeuw"

### Chickadee

"chick-a-dee-dee-dee" busy call notes, 1st note highest song is a whistled "spring-soon" the second note a full tone lower than the first

### American Robin

"cheer-up, cherrily, cherrily, cheer-up" whistled and caroling with breaks between phrases

### White-breasted Nuthatch

"what, what, what, what" or "yank, yank" very nasal

# Mapping Missouri Fish!



**Objectives:** After completing this activity, students will be able to:

**Performance Skills**

1. Use technological tools to locate, select and organize information. (1.4)
2. Discover and evaluate patterns and relationships in information. (1.6)
3. Organize information into useful forms for analysis and presentation. (1.7)

**Content Knowledge**

1. Construct maps with proper titles, legends and orientation; use those maps to process and report information; and develop and answer questions. (SS7; Grade 8 benchmark)
2. Organize information and demonstrate the appearance and diversification of *Notropis* distribution in Missouri. (SC3; VII.E)

**Materials:** Internet access (or copies of *Notropis* distribution by county), copy page (at least 4 per student), Colored pencils (optional) or computer graphics program (optional)

**Background:**

Minnows in the genus *Notropis* are most commonly known as shiners. Minnows are found in nearly all natural waters of the state. Each species has its own particular habitat requirements, and few are distributed statewide. Those with similar requirements tend to have similar distributions, with each section of the state and each habitat having its own characteristic minnows.

**Procedure:**

1. Have students read, "Who's Watching Fish" and "How Fish Swim" in the May issue of *Outside In*.
2. Discuss fish characteristics and habitat. Have students access the Missouri Fish and Wildlife Information System (MOFWIS) on the Internet, [www.conservation.state.mo.us/nathiso/mofwis](http://www.conservation.state.mo.us/nathiso/mofwis).

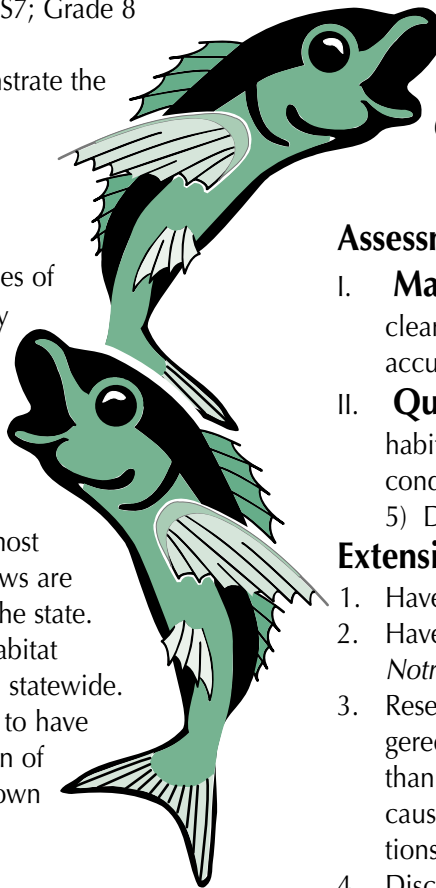
3. Students can then search the database by selecting "Fish" and entering "*Notropis*" as the scientific name. Select an entry, then select "Detailed Report" to find the county occurrences for each species.
4. Break the class into groups of 4-6 students. Provide each group with 24 copies of the county map of Missouri. Have groups select a method for creating legends and titles that would provide some consistency for comparison of individual maps.
5. Each group will do distribution maps of the 24 species of *Notropis* in Missouri. They should divide the work evenly between them (each member will do 4-6 maps). Have each individual create distribution maps using the group's criteria for titles and legends.
6. After they create the maps, have groups compare their maps. Do patterns exist? Have students develop a list of questions based on their observations?

**Assessment:**

- I. **Maps:** 1) Are they properly titled? 2) Is the legend clear? 3) Did they include orientation? 4) Is the coloring accurate for the distribution?
- II. **Questions:** 1) Concise vs. Vague. 2) Do they question habitat requirements? 3) Do they question environmental conditions? 4) Do they question species characteristics? 5) Do questions require thought and research?

**Extensions:**

1. Have students research one of their questions.
2. Have students prepare presentations on one species of *Notropis*.
3. Research the Topeka Shiner (*N. topeka*), a Missouri endangered species. What makes this species more vulnerable than others in the genus *Notropis*? What do you think caused the patchiness of remaining Topeka Shiner populations?
4. Discuss how data on the MOFWIS system might have been collected. What is the importance of continual monitoring of sites for biological diversity?
5. GIS Extension! Use ArcVoyager (a free GIS program for classroom use available at <http://www.esri.com/arcvoyager>) to map distributions on county maps. See pages 4-5 for more information on GIS.





# Mapping Missouri Fish!

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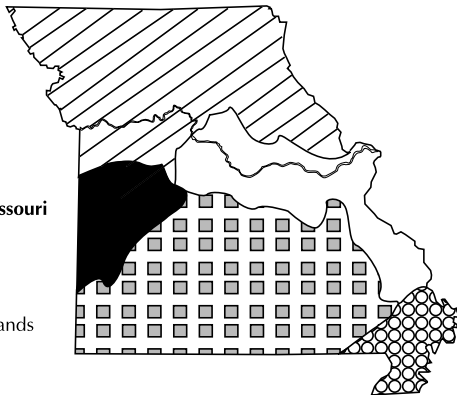
C-7

Title: \_\_\_\_\_



## Natural Divisions of Missouri

-  Glaciated Plains
-  Ozark Border
-  Osage Plains
-  Ozark
-  Mississippi Lowlands



## LEGEND:

# TEACHER resources

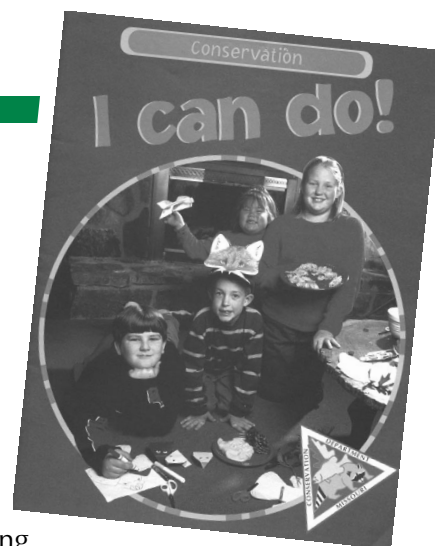
## Missouri Songbirds Poster

Take a look at the revised Missouri Songbirds Poster! This spectacular, full color poster displays 20 of Missouri's most prominent songbirds. The reverse side now features color photographs, bird descriptions and activity ideas that will get you excited about Missouri birds. Even if you have the original version, you'll want a new copy of this poster for all the additional information!



## Conservation I Can Do

The newly released *Conservation I Can Do!* activity guide provides projects for young children that can be done in the comfort of home. Kids will have a blast creating forest and cave panoramas. Learn to make a homemade water viewer that aids in observing the watery world of fish, frogs and aquatic insects. Discover what owl pellets are, and then follow a recipe to make edible human replicas - yum! Kids will have hours of fun exploring this exciting and educational activity guide.



## Butterfly Gardening:

Making your own butterfly garden is an educational way to attract butterflies. For an instructional booklet entitled *Butterfly Gardening and Conservation*, visit <http://www.conservation.state.mo.us/nathis/insects/butterf> or write to the address below.

To receive a copy of these publications, write to:  
Distribution Center, Missouri Department of Conservation,  
PO Box 180, Jefferson City, MO 65102.

# MEDIA loan list

## Birding for Beginners

High School-Adult/ 14 minute video  
Birdwatching is a great way to enjoy the outdoors. The more you learn, the more you see. This video gives the basics of what to look for when you're trying to identify birds, including behavior, color, shape and sound.

## Butterflies

Elementary-Adult/ 10 minute video  
Dynamic nature photography shows the fascinating changes butterflies undergo in a life cycle. Their feeding habits and use of camouflage are also explored.

You may borrow the following items by contacting our Media Librarian at (573)751-4115 x3837, fax at (573)751-2260 or writing to: Media Librarian, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102-0180.